EVIDENCE SUGGESTIVE OF THE OCCURRENCE OF 'INDIVIDUAL DICHROMATISM' IN *MEGASCOPS ASIO.*

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THE common Screech Owl and some of its varieties are typical examples of dichromatism, which may be defined as the occurrence of two distinct phases of color *in different individuals* of the same species, entirely independent of age, sex, or season. It is evident that "the occurrence of two distinct phases of color" *in the same individual*, if "independent of age, sex, or season," must constitute an *individual*, as distinct from the *specific* form of dichromatism. The following account of a pair of Screech Owls shows that 'individual dichromatism' probably occurs in this species, though it is doubtless infrequent, and possibly found only under artificial or even diseased conditions.

Two Screech Owls (*Megascops asio*), said to have been taken from the same brood late in the spring of 1894, were sent to me about Nov. 1, 1894. Both birds were in typical gray plumage, but a minute examination of the feathers was not made at the time, as the possibility of a change in phase had not been thought of, though, as an intermediate between the red and the gray plumage was wanted, it is safe to say that any reddish tint would have been noticed if present. The two Owls were in full autumn dress except for a few downy feathers near the so-called ears.

The Owls were put in a large box cage, with the front of wire netting; and a hole at one side opened into a second box, thus making a dark retiring place, that was never used. Six times each week they were given all the raw beef or sheep's liver that they wanted; but the seventh day they fasted. Fresh water for drinking and bathing, and also gravel were put in the cage daily; while in addition dead guinea pigs, and occasionally live mice, were to be had in the 'animal room' at the Medical School, where

[1] Read at the meeting of the Nuttall Ornithological Club, March 4, 1895.

the cage had been placed. These 'tid-bits' were the cause of much trouble, and after the first trial I never put a mouse in the cage unless there was a second mouse for the other Owl, as a dangerous fight was sure to be the result. By day their sight was as keen as at dusk, but the birds were more restless after dark, though it was necessary to watch closely to prevent them from slipping out while the door of the cage was opened to give them daily food, and I doubt if a movement of any kind was often made that their sharp eyes did not notice. Like all 'Scops' they were quickly tamed, and quite gentle unless frightened. Twice I heard the tremulous *whou-hou-hou-hou-hou* note, each time just after dusk when all was quiet and when no gas was lighted. Spitting, and a scolding rattle when disturbed, were the only other sounds that they were heard to utter. The 'pellets' were unlike those found near the familiar 'owl-holes' and looked like uncooked sausage-meat minus the fat. No gravel was ever found in these castings, yet though more friable than those of the wild birds, they were always firm, well formed, and seemingly held together by a sticky coating that soon dried and looked like gelatine.

Toward the last of November, nearly three weeks after arrival, the larger, and, as it proved, the female Owl, grew more and more red-brown in tint, until there was little pure gray to be found. This was followed by a constantly increasing amount of tawny red; while simultaneously the brownish tinge spread over the upper parts and tail-feathers, and the dark cross bars on the breast seemed to fade. The difference was so marked as to be spoken of by five different persons, who had seen the birds at first. Meanwhile the smaller Owl remained unchanged, so far as could be seen, although in the same cage and apparently under the same conditions as the other.

From the first I searched the cage daily for cast-off feathers, as I wanted to know the number lost when the birds were not molting. During the three weeks and two days only twenty-four feathers were found; 15 of the 'first plumage', 3 tail-feathers and 6 mature feathers, or at least not those of the first plumage. The twelve or even twenty-four new feathers, which had doubtless replaced those lost, were evidently not the cause of the general alteration

in tint that could be seen in almost every feather of the female. On the other hand, it might perhaps be claimed that the total number of feathers composing the plumage had increased, and that the new phase was due to the freshly developed feathers mingling with the old that had been present from the first. The interest and importance of the change in tint of the female Owl was now realized and a thorough search for pin-feathers was made, but without success. Three of the feathers on the breast that seemed without a trace of red or brown in the ground color, were then marked with a pair of scissors to see if they would remain unchanged, but within the next week I found all three feathers on the floor of the cage; two feathers around which I tied a bit of hair, were also cast off or pulled out; and the same result followed with two feathers that were slightly marked with a solution of eosine and water; and also with two that were marked with bi-chromate of potassium. There seemed to be only one way left in which to settle the question as to whether the gray feathers actually changed their tint; so having first 'mesmerized' (?) the owl by laying her on her back and gently stroking her head until she was quiet, I carefully counted all the feathers having a dark median stripe, but without any red or brownish tinge in the ground color, beginning just below the whitish feathers of the throat and going as far as the under tail-coverts, and from the median line of the body to the unstreaked downy feathers under the wing; the result was forty gray feathers. Only three weeks later, on Dec. 21, I could not find more than nine feathers that were free from brownish tinge. It must, I think, be admitted (1) *that an actual change from gray to red-brown took place in the individual feathers, and* (2) *that the red phase was not entirely, if at all, due to new feather growth in the present instance.*

Until December 22, the diet of beef liver was continued, but was occasionally varied by beef kidney, the other conditions remaining as before. The larger Owl continued to approach more and more nearly the red-brown phase, and on Dec. 21 had the general tawny-brown effect seen in specimens that do not show the brilliant red, typical of extreme examples of this phase. Both birds seemed healthy and well; but the smaller Owl now also showed more or less signs of reddish-brown here and there, and some

feathers taken from the breast on Dec. 21, were markedly tawny toward the base. From Nov. 1 until Dec. 21, a total of fifty-nine feathers had been lost by the two birds, but from this number, forty-two must be deducted — (9 lost because of my effort to mark them, 4 tail-feathers, 15 feathers evidently of the younger plumage, and the remaining 14 lost in a fight between the Owls for the possession of a mouse). This leaves for each of the Owls a total loss of nine feathers during the change described above; yet on one of the birds, as we have seen, the majority of the feathers were characteristic of the red-brown phase.

On Dec. 22, the Owls were sent to some Owl-loving friends in the country, where they could have space to fly about, and we hoped to have some young Owlets later. At this time the liver was stopped and they were fed upon raw meat. Every cast-off feather was carefully preserved and labelled, and I heard often of my pets, but especially about the color of the plumage. There seemed to be rather a loss, than an increase of the red-brown effect as time went on, and this was very evident, or at least I thought so, on Jan. 17, when I saw the surviving Owl, which was the larger red-brown female. The smaller and grayer bird had been killed and partly eaten by the other on Jan. 3.

On Jan. 19, the other Owl was found dead in her cage. She was sent to me and is now in my collection, No. 4397. A careful examination showed that the organs were all healthy macroscopically, but the bird was much emaciated, there being almost no fat about the kidneys and mesentery, and but little in the orbits. This was a marked contrast to the fatty degeneration from overfeeding which I believe is usual in captive Hawks and Owls. The condition of the bones of the skull proved that the bird was less than a year old.

This ends the history of my two pets, which I have intentionally given at considerable length. It seems certain that in the larger female Owl there was (1) *a change from the typical gray to the characteristic, though not extreme phase of red;* (2) *and that this was neither caused, nor accompanied by appreciable 'feather loss' (so-called 'molt');* (3) *nor can it have been wholly, if at all, dependent upon new feather growth; and* (4) *it is also evident that there was a distinct change in the color of the individual feathers, which were apparently mature, as seen under the microscope.*

It cannot be said with absolute certainty that the reddish phase was "entirely independent of age, sex, or season," and hence an example of 'individual dichromatism'; but if due to such normal and universal laws as any of the above, the fact of a change of color in the individual could hardly have escaped the notice of ornithologists, while if caused by the ordinary conditions of captivity it must have been recognized long since. The evidence, therefore, seems to be *almost* conclusive that this Owl was an instance of what I have for convenience called '*individual dichromatism*'; and also that this condition is probably infrequent, and doubtless due to some unknown element, not common even in captivity.

(*To be concluded.*)

RECENT LITERATURE.

Sclater on Rules for Naming Animals.[1] — At the meeting of the Zoölogical Society of London, held March 6, 1896, the special topic assigned for discussion was the Code of Rules for Zoölogical Nomenclature adopted by the German Zoölogical Society, or rather the discrepancies between these rules and those of the Stricklandian Code, with a view to their possible reconciliation. The discussion was opened by Dr. Sclater, who appears to have made the principal address of the evening, and who was followed by other speakers.

The discussion, it may be remarked, was apropos of the new work planned by the German Zoölogical Society, called 'Das Tierreich,' which is to comprise the synonymy, the geographical range, and short descriptions of every known species of animal. It is, of course, of the highest importance in a standard work of this magnitude that the rules of nomenclature adopted shall be such as will command the respect of the greatest possible number of workers; for it is Utopian to expect that any code of rules can be devised at present, if ever, that will receive unanimous endorsement. As preliminary to its work the German Zoölogical

[1] Remarks on the Divergencies between the "Rules for naming Animals" of the German Zoölogical Society and the Stricklandian Code of Nomenclature. By P. L. Sclater. Proc. of the Zoöl. Soc. of London, 1896, pp. 306–319.